Sept. 12, 1939. D. M. HETTINGER 2,172,580

WEATHER STRIP

Filed Aug. 7, 1937

Fig. 1.

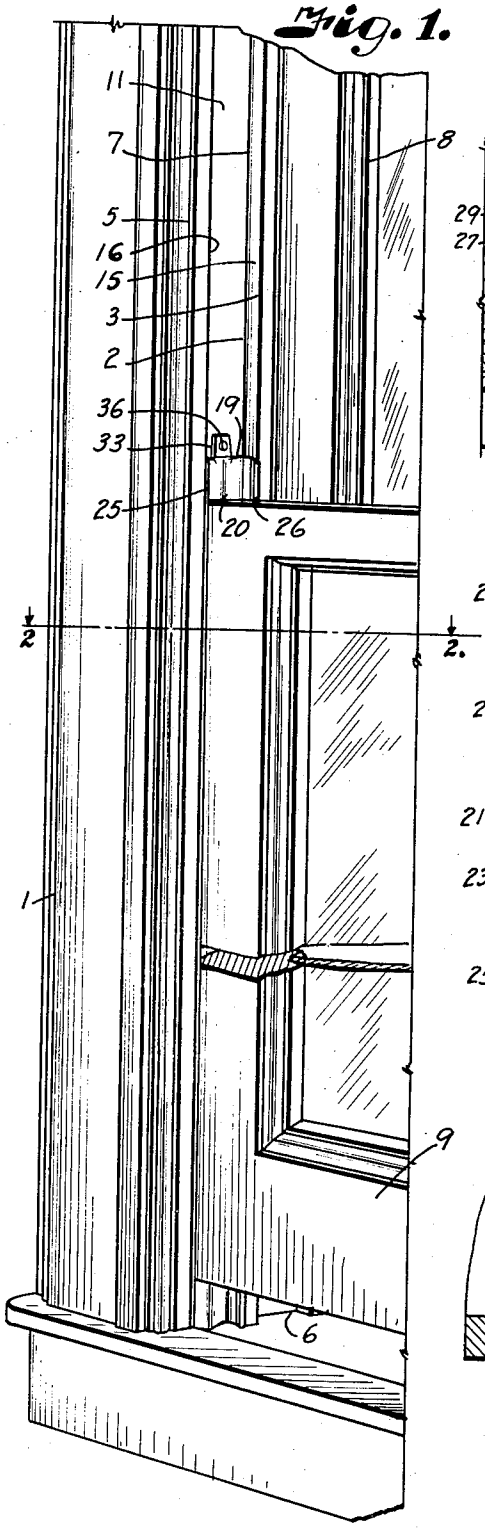


Fig. 2.

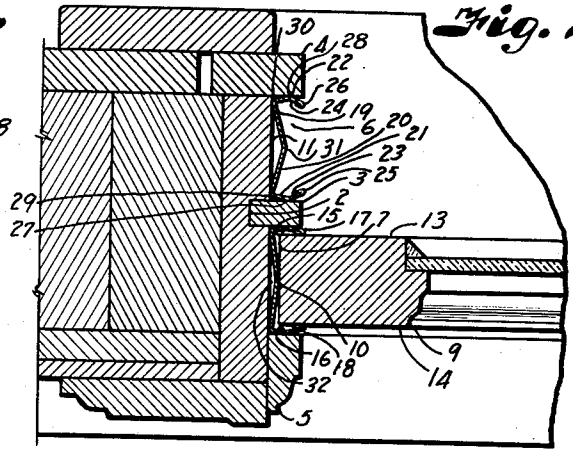


Fig. 3.

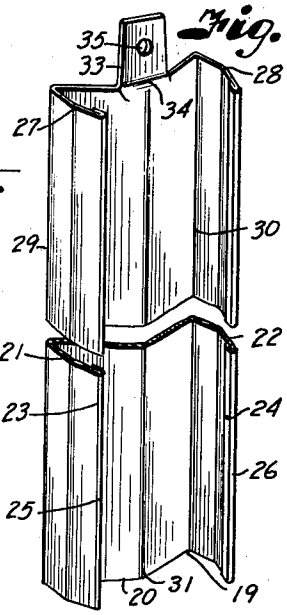


Fig. 4.

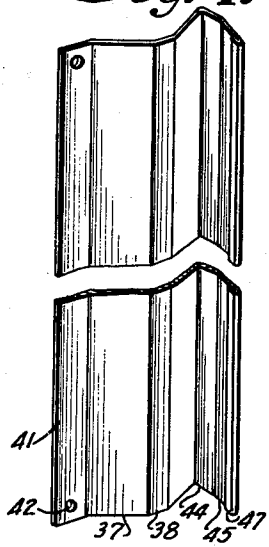


Fig. 5.

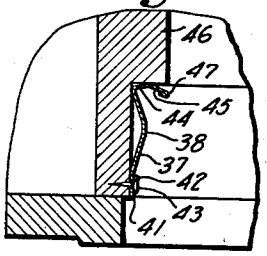
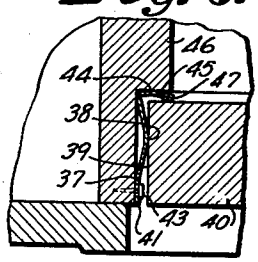


Fig. 6.



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WEATHER STRIP

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6 Claims. (Cl. 20—69)

This invention relates to weather-strips for windows, doors and the like and particularly to those formed of resilient metal.

The principal object of the invention is to provide a weather-strip of this character which is simple and inexpensive to manufacture, and which may be readily applied without alteration of the sash, doors or frames in which it is installed.

Other objects of the invention are to provide a weather-strip construction that forms a weather-tight seal with both the sash and its supporting frame; to provide a weather-strip which forms an effective seal and yet facilitates operation of the sash; to provide a weather-strip of extremely resilient construction wherein the sealing pressure is enhanced incidental to pressure applied by the sash; to provide a weather-strip that is not affected by shrinking and swelling of the wood when installed in connection with wooden frames and sashes or doors; and to provide a weather-proof construction that does not interfere with sealing at the check rail of double hung windows.

It is also a further object of the invention to provide a resilient weather-strip construction that does not subject the window sash to excessive wear.

In accomplishing these and other objects of the invention, as hereinafter pointed out, I have provided improved details of structure, the preferred forms of which are illustrated in the accompanying drawing, wherein:

Fig. 1 is a fragmentary perspective view of a window equipped with weather-strips embodying the features of the present invention.

Fig. 2 is a horizontal section through one side of the window frame and inner sash on the line 2—2 of Fig. 1.

Fig. 3 is a perspective view of a weather-strip constructed in accordance with the present invention.

Fig. 4 is a perspective view of a weather-strip embodying the features of the present invention, and which is particularly adapted for use in connection with doors and hinged sash structures.

Fig. 5 is a horizontal section through a door frame equipped with a weather-strip of the type illustrated in Fig. 4.

Fig. 6 is a similar section showing the door when closed and in sealing contact with the strip.

Referring more in detail to the drawing:

In Figs. 1 and 2 is illustrated a conventional window frame, including side jambs 1, having rabbet grooves 2 containing parting strips 3, which are located between outer blind stops 4 and inner sash stops 5 to form the usual sash grooves or ways 6 and 7 on the opposite sides of the window. Slidably mounted in the ways 6 and 7 are upper and lower sash 8 and 9. In windows of this character considerable space is required between the edges 10 of the sash and the bottoms 11 of the ways, as indicated at 12, and also between the marginal edges 13 and 14 of the inner and outer faces of the sash and the sides 15 and 16 of the ways, as indicated at 17 and 18. These spaces are necessary so that when the sash is swollen by dampness it will not stick or bind beyond the point of immobility. In dry weather conditions the sash and frame shrink, causing the space to enlarge, leaving the sash extremely loose so that there is considerable leakage in and around the sash. The sash is also difficult to operate without binding or wedging due to insufficient guiding contact with the ways. This condition is avoided by the insertion of weather-strips having sealing contact with the sash and which normally press the sash into guided contact with one side of the ways. This construction usually spreads the sashes at the points of their meeting rails and the sashes are not centered within their guides. Ordinary weather-stripping of the metal type also requires removal of the sash and alteration thereof to permit installation of the strips.

As above pointed out, it is a principal object of the present invention to equip a window of the character described with a weather-strip that may be readily applied without alteration of the sash, and which sealingly supports the sash in the center of the guides as now to be described.

19 designates a weather-strip constructed in accordance with the present invention, and which is formed of relatively thin, spring-like material of suitable thinness to engage within the space between the sash and their respective ways. The weather-strip is of substantially channel-shaped cross-section and includes a web portion 20, substantially corresponding in width to the width of the ways and having laterally extending parallel side flanges 21 and 22 that are adapted to sealingly engage the side faces 15 and 16 of the ways. The outer portions of the flanges 21 and 22 terminate in angular wings 23 and 24, converging toward each other so that the spacing therebetween is less than the thickness of the sash. The terminal edges of the wings are bent back against the inner faces of the wings and form reinforced edges 25 and 26 for bearing contact upon the marginal edges 13 and 14 of the sash.

The break lines between the flanges and the wings form bearing contacts 27 and 28 for sealingly engaging the sides 15 and 16 of the ways, and which are urged into sealing contact responsive to pressure of the edge faces 10 of the sash against the web portion 20 of the strip. The angular bends 29 and 30 forming the flanges 20 and 21 also provide points of contact with the bottoms of the ways to sealingly engage within the frame.

In order to enhance sealing engagement with the ways, as well as sealing contact of the terminal edges of the wings with the side faces of the sash, the web 20 is slightly ridged or arched, as at 31, so that when the bends 29 and 30 contact the bottoms of the ways the central portion of the web is spaced therefrom as clearly shown at 32 in Fig. 1. The sash, therefore, press the ridge portion of the webs in the direction of the window jambs to cause inward movement of the wings 23 and 24 incidental to fulcruming action on the angular bends 29 and 30 on the jamb. This inward movement of the wings increases the sealing pressure on the sides of the sash and also increases the contact of the portions 27 and 28.

One end of the strip is provided with an anchoring tongue 33 that is slightly offset from the plane of the ridge portion of the web, as at 34, so that the tongue lies flatly against the face of the jamb without reducing the spring action of the web. The tongue 33 is preferably provided with a suitable aperture 35, through which a fastening device, such as a nail 36, is driven to prevent longitudinal movement of the strip during raising and lowering of the sash.

In installing a weather-strip of the type shown in Figs. 1 to 3 inclusive, one of the stops 5 is removed whereupon the lower sash is readily withdrawn from the frame. The parting stop 3 is then removed and the upper sash is taken from the frame. Weather-strips are then slipped over the side edges of the upper sash with the tongues downward, and the sash replaced in the frame. The parting stop is then reinserted. Weather-strips are then slipped over the side edges of the lower sash with the tongues extending upwardly and the sash is then reinserted in the frame, after which the stop is reapplied. Fastening devices 36 are driven through the apertures 34 in the tongues and into the faces of the jamb to prevent longitudinal movement of the strip when the sash are raised. When the edge faces of the sash engage the ridge portions 31 of the webs, the webs are pressed toward the jamb to cause the wings 23 and 24 on the flanges 21 and 22 to pivot inwardly against the faces 13 and 14 of the sash to increase the inherent tension of the material and enhance sealing engagement with the sash. Each side of the sash is thus sealingly engaged at three points, i. e. by the ridge portion of the web and by the wings. The pressure of the sash on the webs also enhances sealing engagement of the angular contact points or bends 29 and 30 with the bottoms of the ways, and also increases pressure of the flanges 21 and 22 against the sides 15 and 16 of the ways.

In Fig. 4 is shown a sealing strip for use in connection with doors, hinged sash, and the like. A strip of the type shown in Fig. 4 is formed of relatively thin, resilient material, of spring-like character, to provide a crowned web 37 provided with a central, flattened face 38 to sealingly engage the side face 39 of a door 40. Formed on one side of the web is an attaching flange 41, having a series of openings 42 through which fastening devices 43 are driven to secure the strip in position. The opposite side of the web terminates in a lateral flange 44, having an inwardly extending wing 45 for engaging against the outer face of the door, when the door is closed against the stop 45 as shown in Fig. 6. The terminal edge of the wing is bent back, as indicated at 47, similar to the terminal edges of the wings in the first form of the invention.

In applying a strip as shown in Fig. 4, the flange 44 is inserted against the stop 46 of the door frame, and the anchoring flange 41 is secured to the jamb by driving the nails 49 through the openings 42 and into the jamb. The raised portion of the web provides sufficient rigidity in the strip so as to prevent buckling thereof in case of shrinkage in the material from which the frame is constructed. The weather-strip therefore remains in snug engagement with the jamb and does not loosen so that air currents cannot pass through the space between the door and the jamb. This form of the invention is readily applied without removal of the sash or doors and may also be used in the ways of a double hung sash window.

From the foregoing it is obvious that I have provided a weather-strip which is readily applied, and which is so constructed that pressure of the sash or door against the weather-strip enhances sealing engagement thereof so as to provide a positive seal against the elements and yet allows freedom of movement of the sash or door as the case may be.

What I claim and desire to secure by Letters Patent is:

1. A weather-strip formed of thin spring-like material and having an arched web provided with spaced parallel bearing portions at the terminal edges of said web adapted to contact with a jamb encasing an opening, a flange extending along one of said bearing portions at substantially right angles to the adjacent side of said web to conform closely to the angle between said jamb and the face of an adjacent stop on the jamb and to provide a defined linear bearing contact with the stop, and a wing extending inwardly along said linear bearing contact at an obtuse angle to said flange for contact with a closure slideable in said opening, the terminal edge of said wing having a flange bent back upon said wing for stiffening said wing to maintain coextensive contact with said closure between a side face thereof and said stop.

2. A weather-strip formed of thin spring-like material and having an arched web provided with spaced parallel bearing portions at the terminal edges of said web to contact with a jamb encasing an opening, a flange extending along one of said bearing portions at substantially right angles to the adjacent side of said web to conform closely to the angle between said jamb and the face of an adjacent stop on the jamb and to provide a defined linear bearing contact with said stop, a wing extending inwardly along said linear bearing contact at an obtuse angle to said flange for contact with a closure slidable in said opening, the terminal edge of said wing having a flange bent back upon said wing for stiffening said wing to maintain coextensive contact with said closure between a side face thereof and said stop, and means for anchoring the other bearing portion of said web to the jamb.

3. A weather-strip formed of thin spring-like

material having a series of parallel angular bends to form an arched web having spaced parallel bearing portions extending along two of said angular bends adapted to contact a jamb encasing a window opening, sealing flanges extending along said jamb contacting portions of said bends at substantially right angles to the adjacent sides of said web to conform closely to the angles between said jamb and the faces of adjacent stops on the jamb and to provide defined linear bearing contacts with said stops on the next adjacent angular bends, and wings extending inwardly along said stop contacting bends having terminal edges adapted for contact with said faces of a sash closing said opening, the terminal edges of said wings being bent back upon said wings for stiffening the wings to maintain said contact with the sash.

4. A weather-strip formed of thin spring-like material having a series of parallel angular bends to form an arched web having spaced parallel bearing portions extending along said angular bends defining said web and adapted to contact a jamb of a window opening, flanges extending along said jamb contacting portions at substantially right angles to the adjacent sides of said web to conform closely to the angles between said jamb and the faces of adjacent stops on the jamb and to provide defined linear bearing contacts with said stops on the next adjacent angular bends, wings extending inwardly along said stop contacting bends having terminal edges adapted for contact with a sash closing said opening, said edges having portions bent back upon said wings for stiffening the wings to maintain contact with the sash, and means for anchoring the ends of the strip to said jamb.

5. A weather-strip formed of thin spring-like material having parallel angular bends extending longitudinally of said strip to provide an arched web having a central line bearing contact along one of said bends adapted to engage the side edge of a sash and spaced parallel angular contacts along the next adjacent bends adapted to engage within the angle between the jamb and stops of a frame carrying the sash, flanges extending along said spaced angular contact portions at substantially right angles to the adjacent sides of said web to form bearing contacts at the next adjacent angular bends adapted to engage said stops in said jamb, and wings extending inwardly along said stop bearing contacts for sliding engagement with the inner and outer sides of said sash, the portions of the strip between said bends lying normally in flat planes.

6. A weather-strip formed of thin spring-like material having parallel angular bends extending longitudinally of said strip to provide an arched web having a central line bearing contact along one of said bends adapted to engage the side edge of a window sash and spaced parallel angular contacts along the next adjacent bends adapted to engage within the angle between the jamb and stops of a frame carrying the sash, flanges extending along said spaced angular contacts at substantially right angles to the adjacent sides of said web to form bearing contacts at the next adjacent angular bends adapted to engage said stops in said jamb, and wings extending inwardly along said stop bearing contacts for sliding engagement with the inner and outer sides of said sash, said wings having portions bent back upon themselves to reinforce the portions of said wings which are adapted for sliding contact with said sash, the portions of the strip between said bends lying normally in flat planes.

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